ONE FACILITIES ENGINEER VOICE

NAVFAC
Naval Facilities Engineering Command
Engineering Service Center

Innovation...
Leadership...
Performance

National Defense Industrial Association

Plenary Session Presentation

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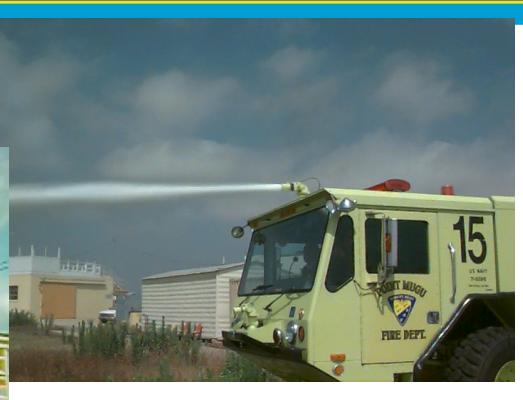
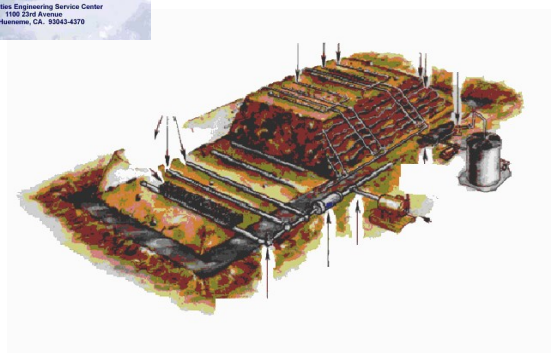
Environmental

Pollution Prevention

Environmental Compliance



Weapon System Environmental Support



Environmental Technology and Information Transfer

Cleanup and Site Characterization

Conservation

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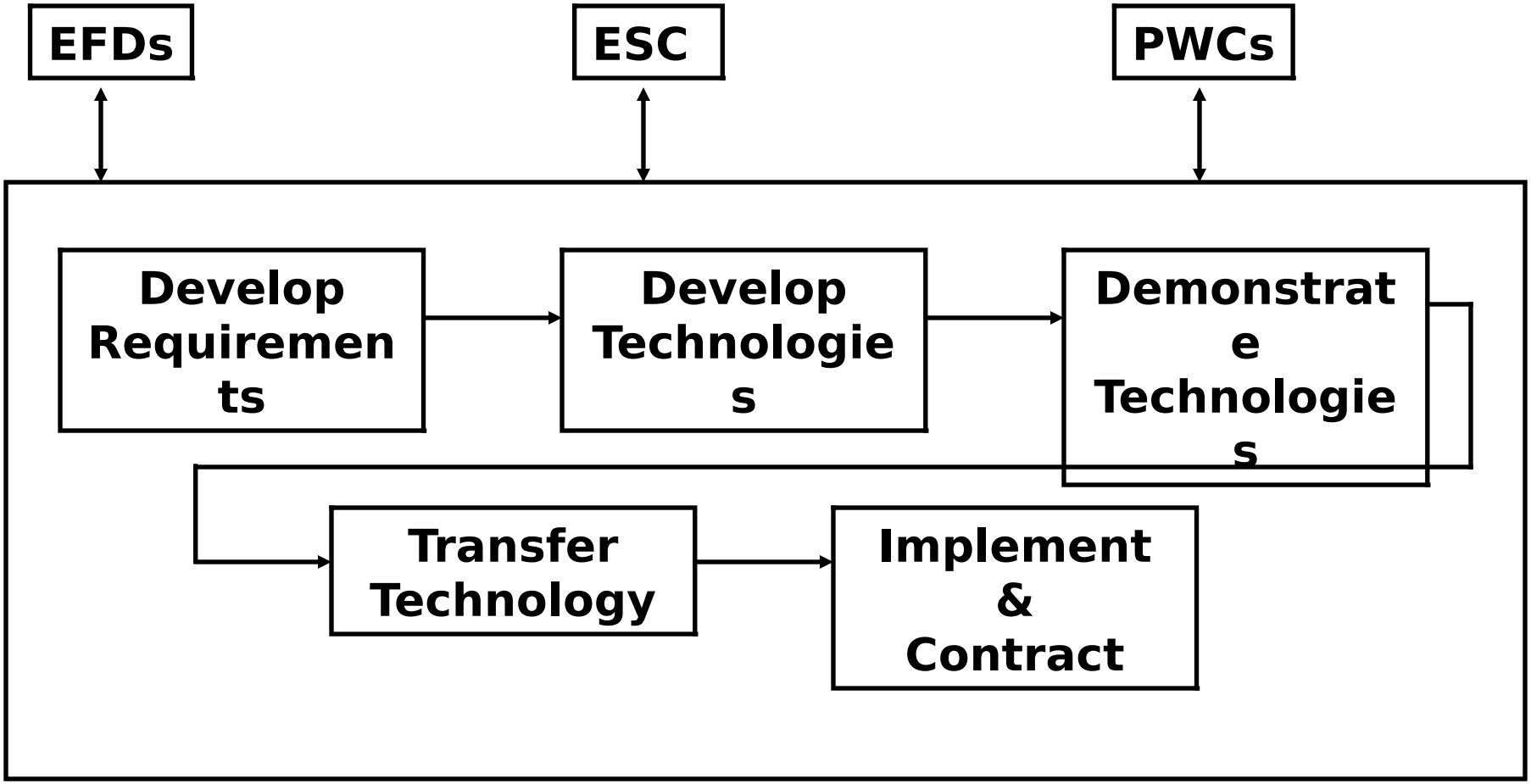
Navy Shore Technology Implementation Scheme



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Cleanup Major Thrusts and Initiatives

- **Munitions Response Program / Range Sustainability**
- **Perchlorate Site Remediation**
- **Chlorinated Site Remediation**
- **Cleanup Site Optimization**
- **Long Term Management**
- **Ecological Risk Assessment**
- **Contaminated Sediments**
- **National Environmental Technology Test Sites (NETTSs)**

Fate and Effects of Underwater Ordnance

PROBLEM: Range sustainability and BRAC have raised environmental concerns regarding land based and underwater Ordnance contamination.

Prepared an Initial Decision Report (IDR) which identified the following data gaps:

- **MEC Degradation in Sediment***
- **MEC Degradation in Seawater***
- **Sediment Toxicity***
- **MEC Casing Corrosion***
- **Physical Transport ***
- **Eco-risk Assessments**
- **Field Screening Tech for MEC Contamination**
- **Detection Techniques**

*Current work ongoing in these areas

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Perchlorate Remediation at NSWC Indian Head

- **NSWC Indian Head**
  - **Manufactured Weapon Systems**
  - **Perchlorate Levels in Groundwater 170 ppm**
- **Small Pilot System**
  - **Buffer w/Carbonate/Bicarbonate**
  - **Electron Donor Addition**
  - **Successful Demonstration w/results in 20 weeks**
  - **95% Reduction in Perchlorate levels in 8/9 wells**
  - **2 Wells below the Reporting Limit of 4ppb**

IHDIV Hogout Facility

National Test Site Program

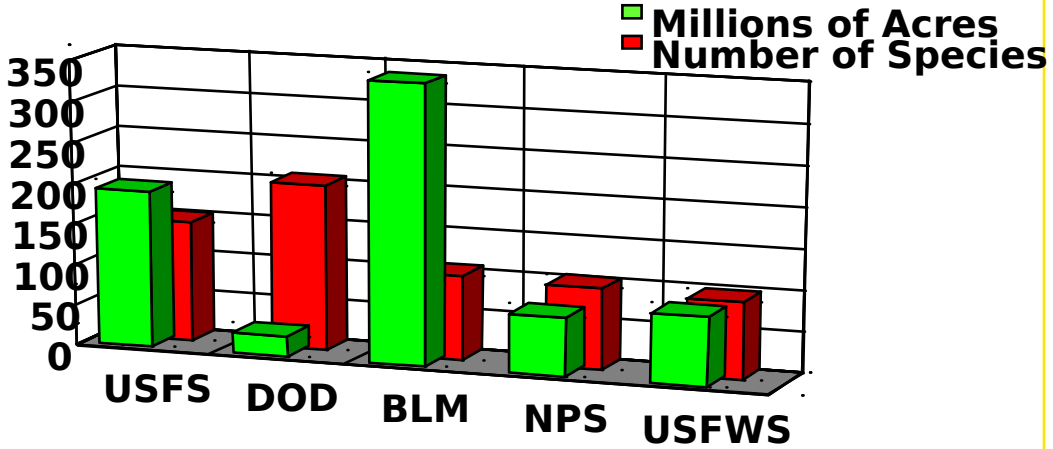
Hydrocarbon Remediation National Test Site at CBC Port Hueneme

- **Funded by DoD SERDP**
- **Supported by Science Advisory Board**
- **Demonstrate Innovative Site Characterization and Cleanup Technologies**
- **Navy - Hydrocarbon**
- **Air Force - Solvents**
- **Data Reciprocity**

NTS

Navy Training Lands Sustainability: Initiation

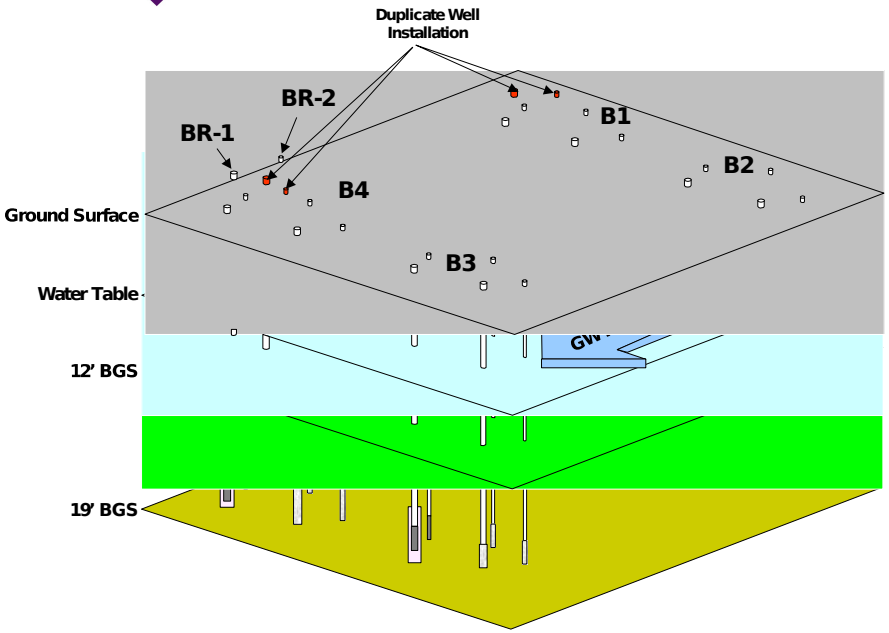
- Determine critical data needs of Navy range managers to support Fleet Inter-Deployment Training Cycle (warfighter readiness) & RDT&E range needs to support the testing and fielding of new weapons systems.



*Adapted from Natural Heritage Data Network - The Nature Conservancy

- Report Due 31 Mar 04

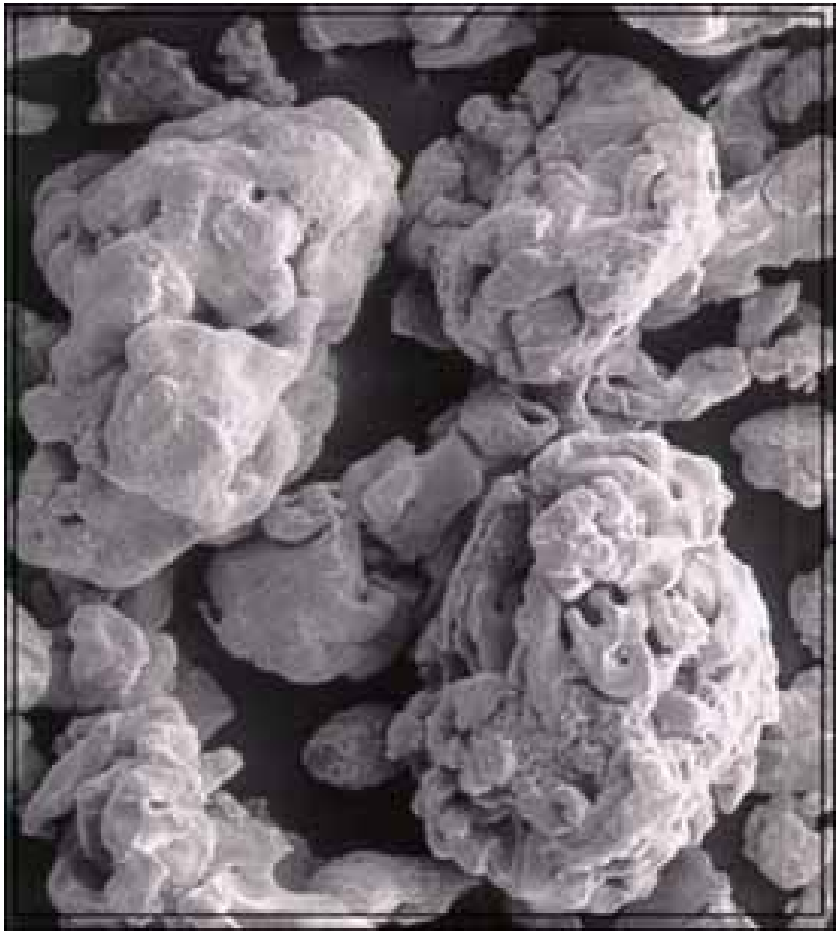
Demonstration/Validation of Long-Term Monitoring Using Wells Installed by Direct-Push



Test Cell Design at Port Hueneme, CA

- **Compare groundwater samples collected from conventionally drilled and direct push installed wells to determine if well installation method affects analyte concentrations.**
- **ITRC Tech Reg. final document - 08/04**
- **ITRC follow-up training modules - Fall 2004**
- **Two new ASTM standards**
  - **ASTM 6724 - Standard Guide for Installation of Direct Push Ground Water Monitoring Wells**
  - **ASTM 6725 - Standard Practice for Direct Push Installation of Prepacked Screen Monitoring Wells in**

ZVI Powder for In-Situ Dechlorination of Chlorinated Organic Compound (TCE/PCE)

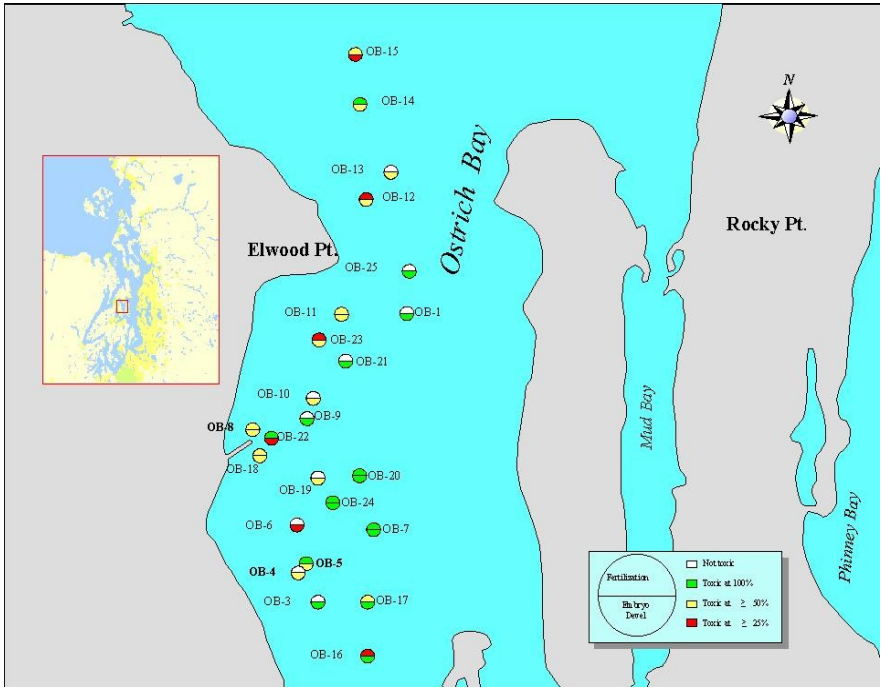


Zero Valent Iron Powder

- Irregular shape provides high reactive surface area
- About 40 µm in size, easy to disperse to pore spaces and can treat adsorbed contaminants bond to soil
- Over 99% reduction in TCE/PCE within 3 weeks
- Reduce cleanup cost from $125-$300 to $75/ cu yd

ZVI Powder

Determination of Toxicity of Ordnance Compounds



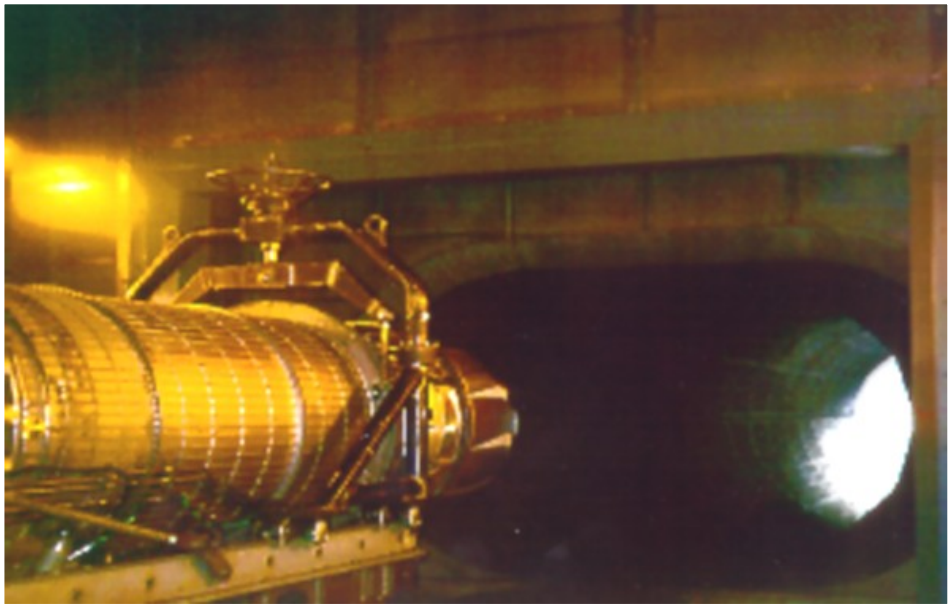
Map of Puget Sound showing sampling locations

- **Established the acute and chronic toxicity to marine species**
- **Ordnance compounds are not responsible for toxicity**
- **Toxicity due to additive effects of PAHs**
- **Avoided $9M**

P2/Compliance Thrusts and Initiatives

- Air Emission Reduction
- Noise Reduction Technologies
- Storm Water Runoff Control and Monitoring
- Air and Water Security Monitoring
- Weapon Systems Acquisition Environmental Support
- National Emission Standard for Hazardous Air Pollutants (NESHAPs) Compliance

JETC Noise Reduction



Entrance to augmenter tube of the T-10 jet engine test cell.

- **Noise Reduction**
  - **– Annular After Reactor (-20 dB)**
  - **– Core Busters (-7 dB)**
  - **– Stack Height (-8 dB)**

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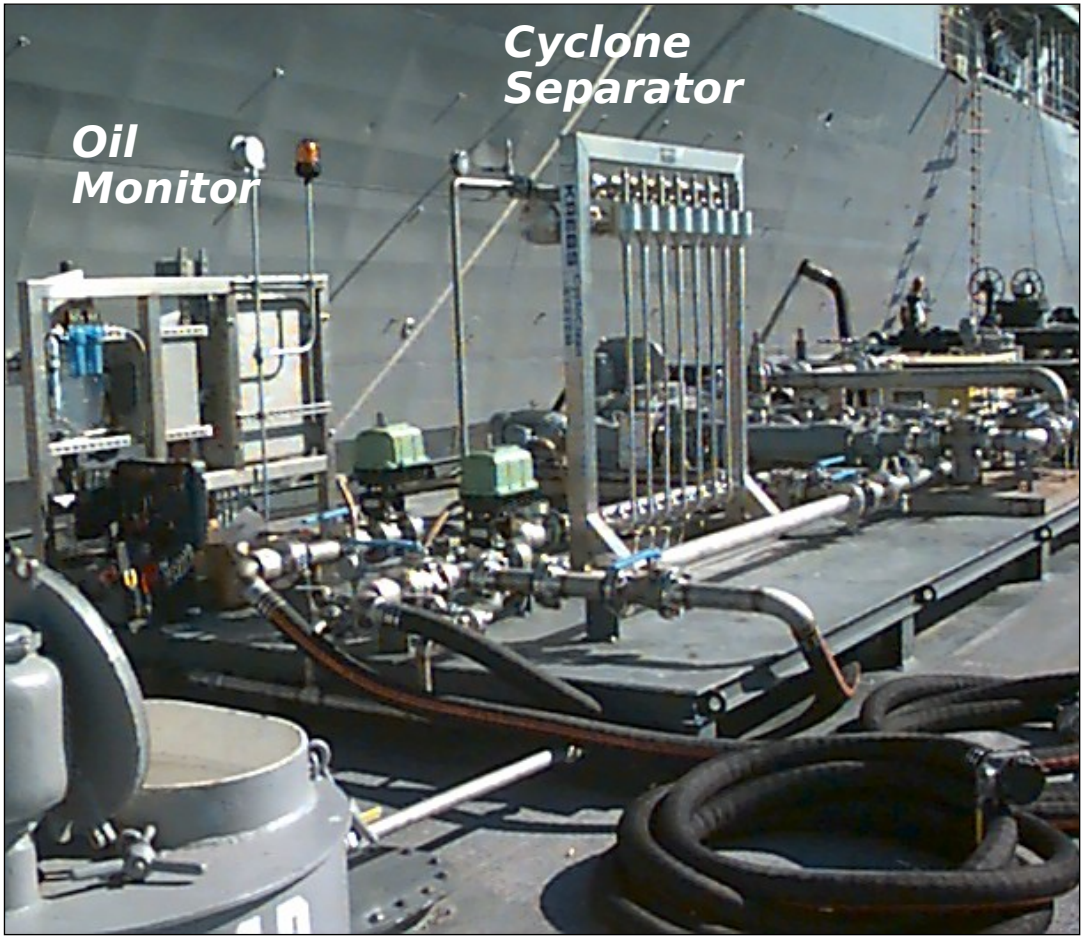
In Port Collection and Treatment of Compensated Fuel Ballast



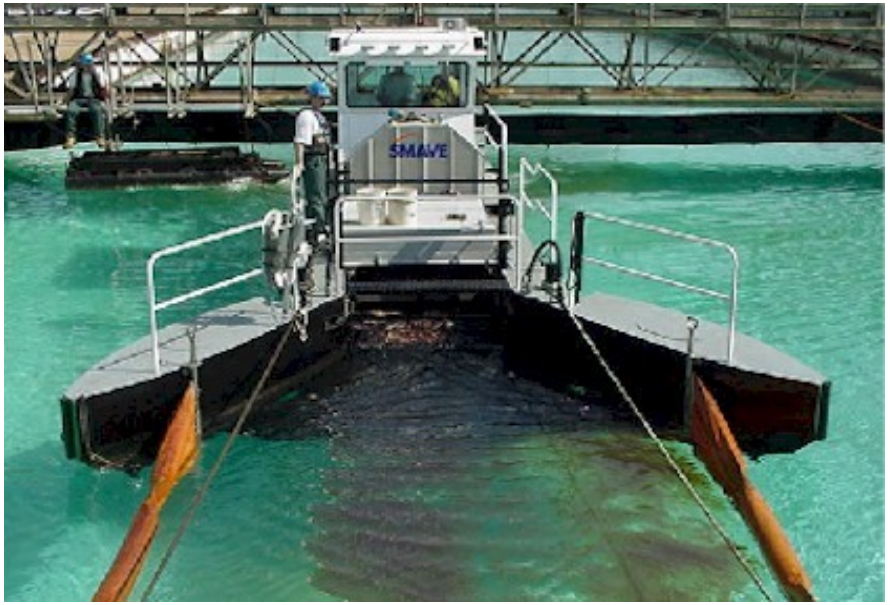
NAVSTA Everett barge mounted compwater treatment system

- **Pierside collection and treatment system for compensated fuel ballast water (compwater)**
- **Cost effective (O&M cost of $0.02/gal vs. $0.25/gal)**
- **Oil removal efficiency >99%**
- **Meets pretreatment discharge standards**
- **Allows refueling in port**
- **$600K/yr cost**

Advanced Oil Spill Equipment

- **Evaluation of New Skimmers for Improved Procurement Criteria**
- **Performance Measured at OHMSETT Facility for Light Hydrocarbon Spills**
- **Improved Rapid Response and Spill Cleanup for Navy Harbors**

Innovative Weir and Vacuum Type Skimmers



Oil Skimmer

Aircraft Rescue and Fire Fighting (ARFF) Vehicle NoFoam Unit

Mobile NoFoam Unit for ARFF Vehicles Foam System Testing

- **Eliminates AFFF use in routine nozzle checks**
- **Uses environmentally benign dye solution**
- **Satisfies NAVFAC test requirements**
- **Costs < $20K**
- **Payback < 1 month**
- **Eliminates WW collection facilities at $1M each**
- **Projected Navy-wide cost avoidance >$5M/year**

AFFF NoFoam Unit

AFFF Wastewater Treatment System

Air-Sparged Hydrocyclone

- **Air-Sparged Hydrocyclone (ASH) System Removes AFFF from Wastewaters to <30 ppm**
- **Reduces Disposal Cost from $1-3/gal to <1 Cent/gal -- >$6M Cost Avoidance/yr**
- **Complies with Clean Water Act. Avoid NOV and Upsetting IWTP**

Biological Detoxification of Oily Sludges

Oily Sludge Bioreactor (10,000 gallons) at Naval Station Pearl Harbor

- **Aerobically degrades oily sludges to CO_2 and water**
- **Bi-product (biomass) can be used as nutrients for composting**
- **Renders oily sludge non-hazardous**
- **Reduces disposal costs from $0.76 to $0.35 per lb for a Navy-wide cost avoidance of $3M/yr**
- **Demonstrated 10K gal**

Oily Sludges Detox

Biodiesel From Vegetable Oil Waste

Biodiesel production prototype

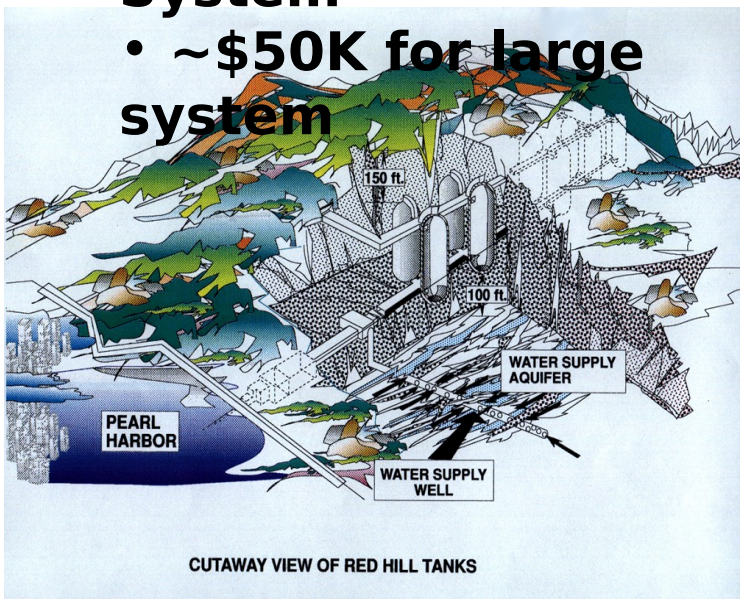
- Converts used vegetable oil (a solid waste) into fuel for diesel engines
- Biodiesel reduces particulate, CO, and hydrocarbon emissions (20-40%)
- Provides an Alternative Fuel Vehicle (AFV) credit

Biodiesel

- Reduces diesel fuel consumption

Low Range Differential Pressure (LRDP) Leak

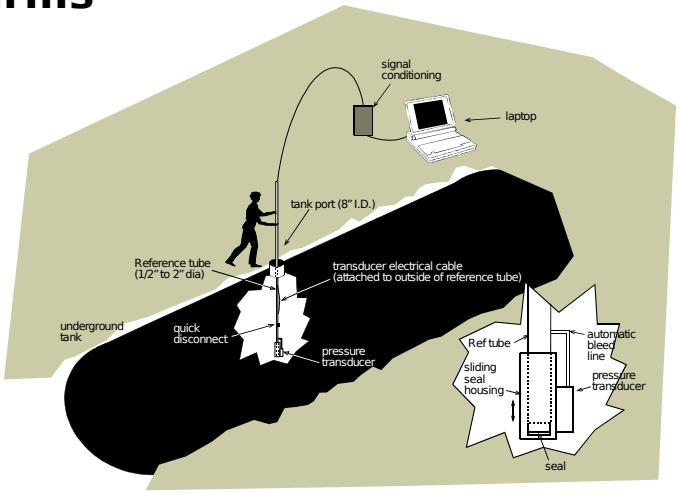
- **Certified to 0.32 GPH**
- **$10K for PRT System**
- **~$50K for large system**

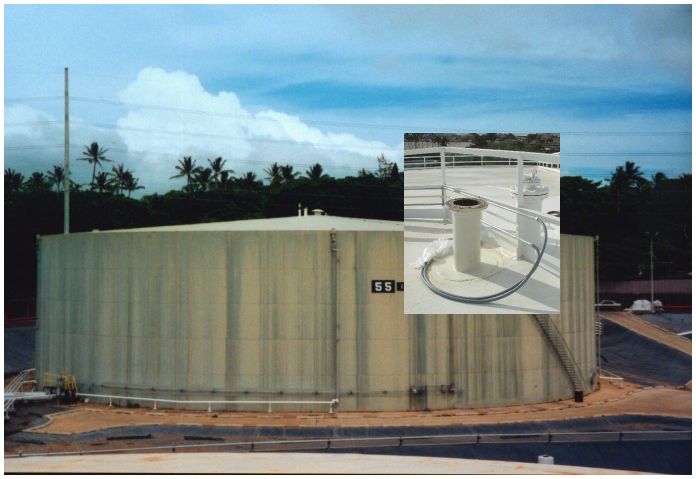


Large Bulk Underground Fuel Tanks (50k – 12M gal)

LRDP with temp sensors for Aboveground Storage Tanks

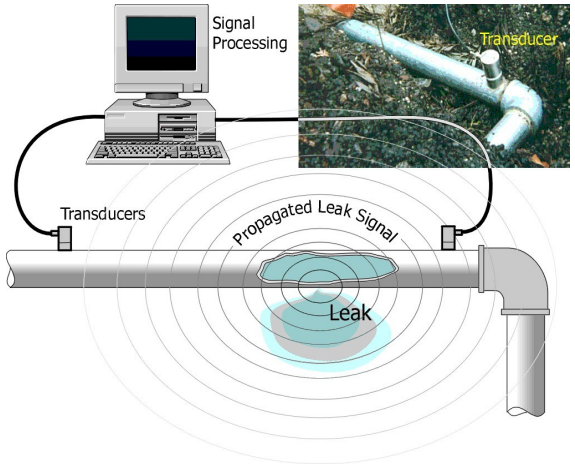
Portable Rapid Test (<50 kgal) for Fuel Farms

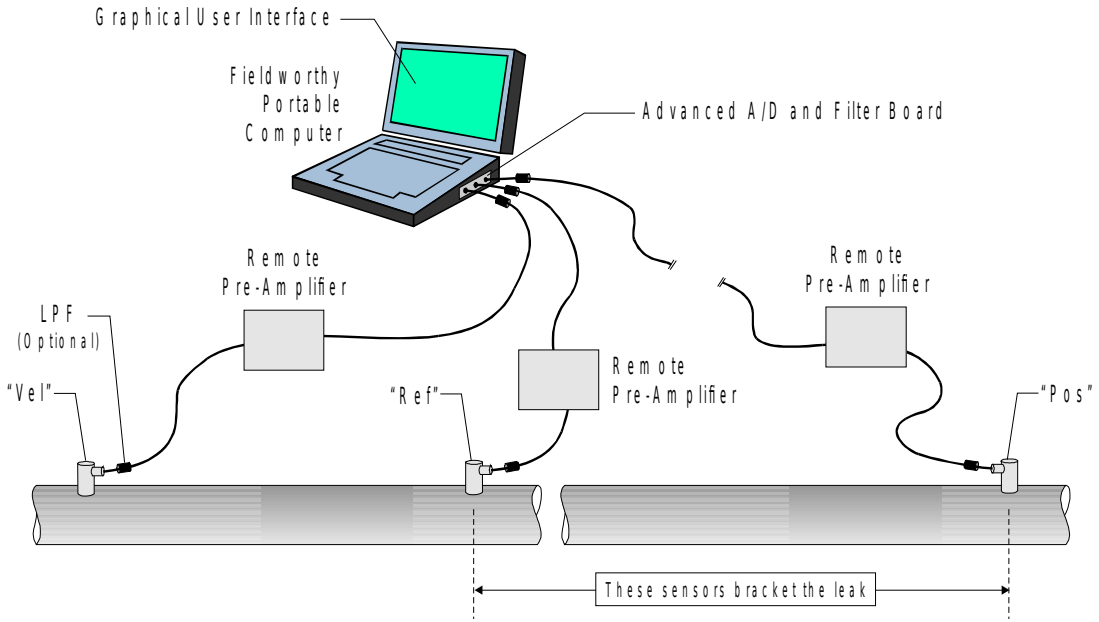




LRDP/PRT

Pipeline Acoustic Leak-Location System (PALS)





- **Operational Under ambient noise conditions**
- **Leak rates > 2 GPH through holes of 0.01 to 0.04 in.**
- **At pressures > 30 psi with sensor spacing > 500 ft**
- **Sensors mounted on the ends of the pipe, blinds, and flanges**
- **accuracy of 3 ft or 0.5% to 1.5% of sensor separation distance**

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Pollution Prevention Equipment Program

- Centralized Navy P2 Program
- Accomplishments:
  - Over 12,000 items implemented
  - Lower Operational Costs
  - Reduce Toxic Chemical Releases
  - >$100M Cost Avoidance

Welding fume collection

Environmental Support for Weapon Systems

ESH Evaluations Underway for Seahawk Upgrade SH-60R

- **Incorporate P2 at the beginning of weapon systems development**
- **Conduct programmatic environmental, safety, & health (ESH) evaluations**
- **Perform environmental Planning, de-Mil/disposal, and environmental life cycle cost analysis,**
- **Reduce life cycle O&M costs**

wsa

Broad Agency Announcement (BAA)

Carbon Adsorption Bed For VOCs at Site 9 NASNI

- Streamlined & Flexible Contracting Approach
- Cleanup & P2/Compliance Programs
- Easy For Vendors to Apply
  - Four page abstract submittals
  - Submit anytime
- Status (as of Mar 04)
  - >65 contract awards
  - >$28M in awards
  - >255 acceptable abstracts

baa

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CER for Environmental Restoration

Technology	Sites	DT&E Invest.	Cost Avoided	CER* Actual
Biopiles	8	$ 7.5M	$14.2M	1.9
Bioslurping	7	$ 4.3M	$ 9.3M	2.2
Intrinsic Bioremediation	3	$ 4.3M	$ 1.9M	0.4
Alternative Landfill Capping	3	$ 9.7M	$26.1M	2.7
Permeable Reactive Wall	1	$ 8.0M	$25.0M	3.1
Photolytic Destruction	1	$ 0.7M	$ 1.0M	1.4
BCDP	1	$ 8.3M	$15.1M	1.8
Recycling to Asphalt Plants	3	$0.78M	$0.89M	1.1
Recycling to Cement Kilns	1	$ 0.8M	$ 1.8M	2.3
Low Temp Thermal Treatment	1	$0.44M	$0.38M	0.9
Phytoremediation	1	$ 0.4M	$ 6.0M	15
In-situ - Thermal Desorption	1	$ .05M	$ .10M	2
In-situ Chemical Oxidation	1	$ .22M	$ 2.0M	9.1

CER for P2/Compliance

Technology	Sites	DT&E	Cost	LC	Actual	LC
			Invest. ($M)	Avoided ($M)	Avoid.	CER*
CER*						
Bilge Oily WW Treat. System	14		$200K	60	150	300
750						
Metal Preparation and Plating	14		$1,093K	3	8	3
7						
Shelf life and HAZMAT Recycle	7		$1,613K	5	100	3
62						
Improved Degreasers	8		$350K	5	25	14
71						
Sodium Nitrite Wastewater	5		$886K	3	10	3.4
11						
CFR Truck AFFF Waste Control	15		$223K	10.3	40	46
179						
Live Front Switch Gear Cleaning	2		$125K	0.2	3	2
24						
ASH for AFFF Wastewater	2		$740K	0.1	100	0.1
135						

CER.1